

STATUS, PRESSURES AND MANAGEMENT PRIORITIES IN UPEMBA NATIONAL PARK, DEMOCRATIC REPUBLIC OF THE CONGO

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ABSTRACT

Upemba National Park in southern Democratic Republic of the Congo remains a high-conservation-value protected area for which recent ecological evidence has not been comprehensively synthesised. This paper assesses the park's current condition using published sources, grey literature, recent field records, camera-trap data, aerial observations and expert field knowledge. Upemba has lost multiple large mammals over the past seven decades, and surviving populations are small, localised and unevenly distributed. These remnant populations indicate partial resilience rather than ecological integrity. Available evidence suggests that depletion extends below visible megafauna and is associated with bushmeat extraction, recurrent anthropogenic fire, encroachment and wetland degradation, especially where effective control is weak. Under these conditions, the immediate conservation task is stabilisation rather than comprehensive recovery. Near-term management should prioritise protection of confirmed strongholds and recurrent -use areas for priority taxa, repeated monitoring of large mammals and hunting pressure, systematic fire monitoring, and targeted wetland sentinel sites. Research should focus on uncertainties that affect short-term management decisions. Upemba is highly endangered, but not yet lost; what remains is sufficient to justify focused stabilisation.

Key words: faunal depletion, bushmeat hunting, fire regime, wetland conservation, adaptive monitoring

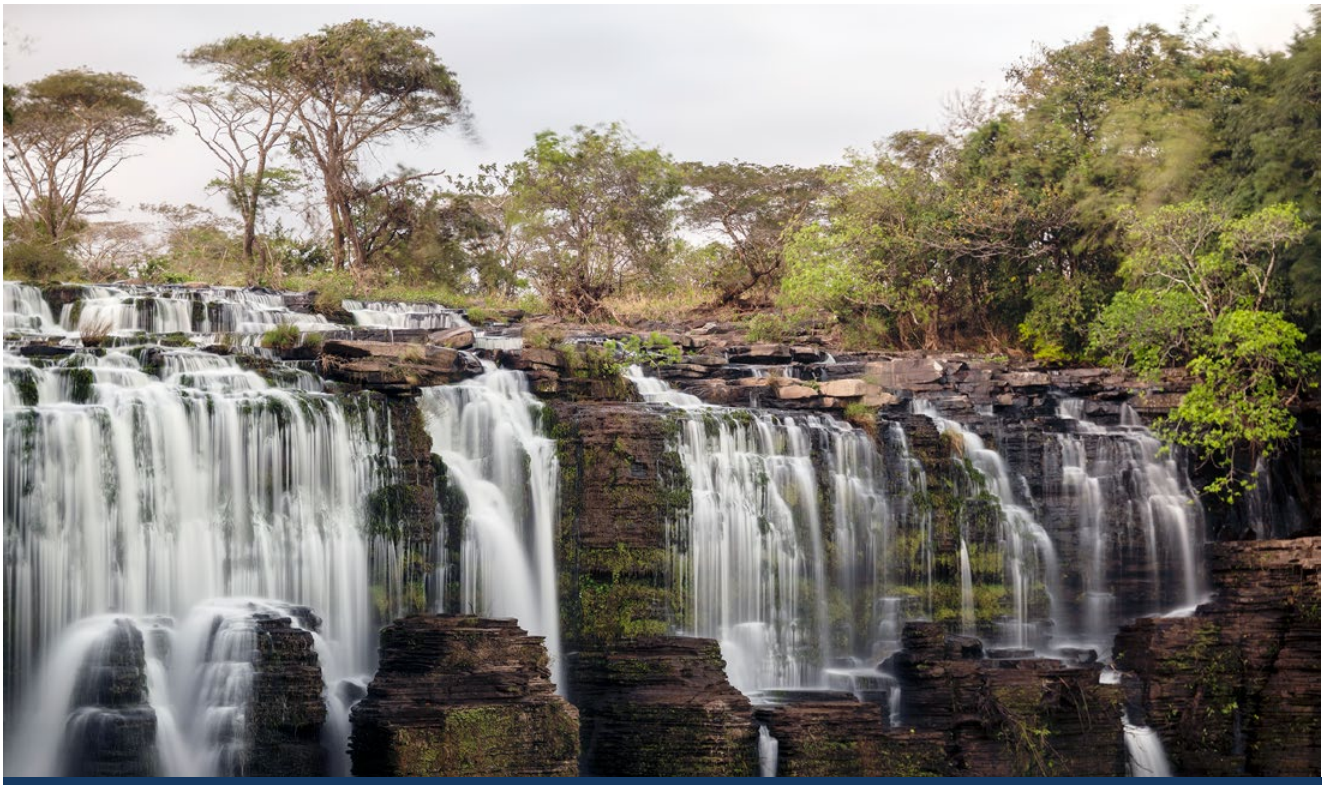
INTRODUCTION

Biodiversity continues to decline, even in protected areas, especially where management operates under insecurity, weak monitoring and poor information infrastructure (Craigie et al., 2010; Pulido-Chadid et al., 2023). In such contexts, the key conservation problem is not only biological but evidentiary: how should managers interpret ecosystem condition when the available knowledge is sparse, heterogeneous and biased towards a few visible species?

Upemba National Park is an acute example of that problem. This one-million-hectare national park in southern Democratic Republic of the Congo has high conservation value, but recent evidence on its ecological condition remains scattered across published sources, grey literature, internal records and field knowledge. Upemba still retains African elephant (*Loxodonta africana*), Grant's zebra (*Equus quagga boehmi*), sable (*Hippotragus niger kirkii*), Cape buffalo (*Syncerus caffer*), hippo (*Hippopotamus amphibius*) and the endemic Upemba lechwe (*Kobus anselli*), and for that reason can appear more intact than it is. However, several large mammals have been extirpated, surviving populations are small and localised, and there are strong indications that ecological erosion extends well below the level of visible megafauna.

Upemba's conservation significance is not limited to its surviving large mammals. The park comprises at least two biologically distinct systems, the Kibara and Manika grassland plateaus and the Kamalondo Depression wetlands (Fig. 1), which have localised and, in some cases, endemic biodiversity that remains much less well documented than the megafauna (Broadley & Cotterill, 2004; Cotterill, 2003, 2004, 2005, 2006; de Witte et al., 1966). Current evidence may therefore understate not only the degree of ecological erosion, but also the conservation importance of areas of the park whose value lies in neglected taxa.

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Falls on the Kalule Nord River near the Kayo substation, on the southern margin of Upemba National Park © Gwenn Dubourthoumieu/ Upemba National Park

Upemba's present condition reflects a long mismatch between legal protection and effective territorial control. Created by decree on 15 May 1939 as a *réserve naturelle intégrale* of approximately 1.15 million ha, its boundaries were already a compromise balancing wildlife protection, fisheries, concessionary mining interests and pre-existing local use rights (Décret du 15 mai, 1939; Derkinderen, 1955; Van Schuylenbergh, 2006). The 1946–1949 exploration of Upemba resulted in exceptionally detailed taxonomic documentation for the park, but did not address weak legitimacy (de Witte et al., 1966). After independence, Upemba was the Congolese park most affected by administrative collapse, reoccupation of former lands and intensified poaching (Prigogine, 1967; Verschuren, 1975). The 1975 boundary reform during a brief period of renaissance under Mobutu's Zaire partly acknowledged continued wetland use in the Kamalondo Depression by formalising the distinction between more enforceable plateau areas and a weakly controlled wetland periphery (Ordonnance No. 75/241, République du Zaïre, 1975; Verschuren, 1971). Since the early 2000s, the presence of Mai-Mai militia has strongly reduced management presence and wildlife populations, explaining why current evidence is spatially uneven and why conservation now depends on stabilising remnant biological cores, defined here as confirmed strongholds and recurrent-use areas for priority taxa, while rebuilding operational control (d'Huart, 1991; Hasson, 2003, 2015; Van Leeuwe et al., 2009).

This paper synthesises the current ecological state of the park by asking: what does the currently available evidence already justify in terms of assessing protected-area condition, identifying immediate management priorities, and defining targeted monitoring needs in Upemba? It reviews the status of the park's surviving large mammals, examines the main interacting pressures, and proposes a triaged management and research agenda. The central argument is that Upemba is neither intact nor lost, but a depleted, resilient and incompletely known protected area in which conservation must proceed before uncertainty is resolved.

METHOD

This study uses published literature, grey and internal reports, patrol and survey records, aerial observations, camera-trap records, and expert field knowledge accumulated through work in and around Upemba between September 2023 and February 2026 to synthesise the current condition of the park. The analysis addresses three linked questions: the current status of large mammals in and immediately around the park, the principal pressures currently affecting ecological condition, and the near-term management and research priorities justified by the available evidence. The aim is to derive a transparent, evidence-weighted interpretation of park condition and management priorities from incomplete and uneven knowledge.

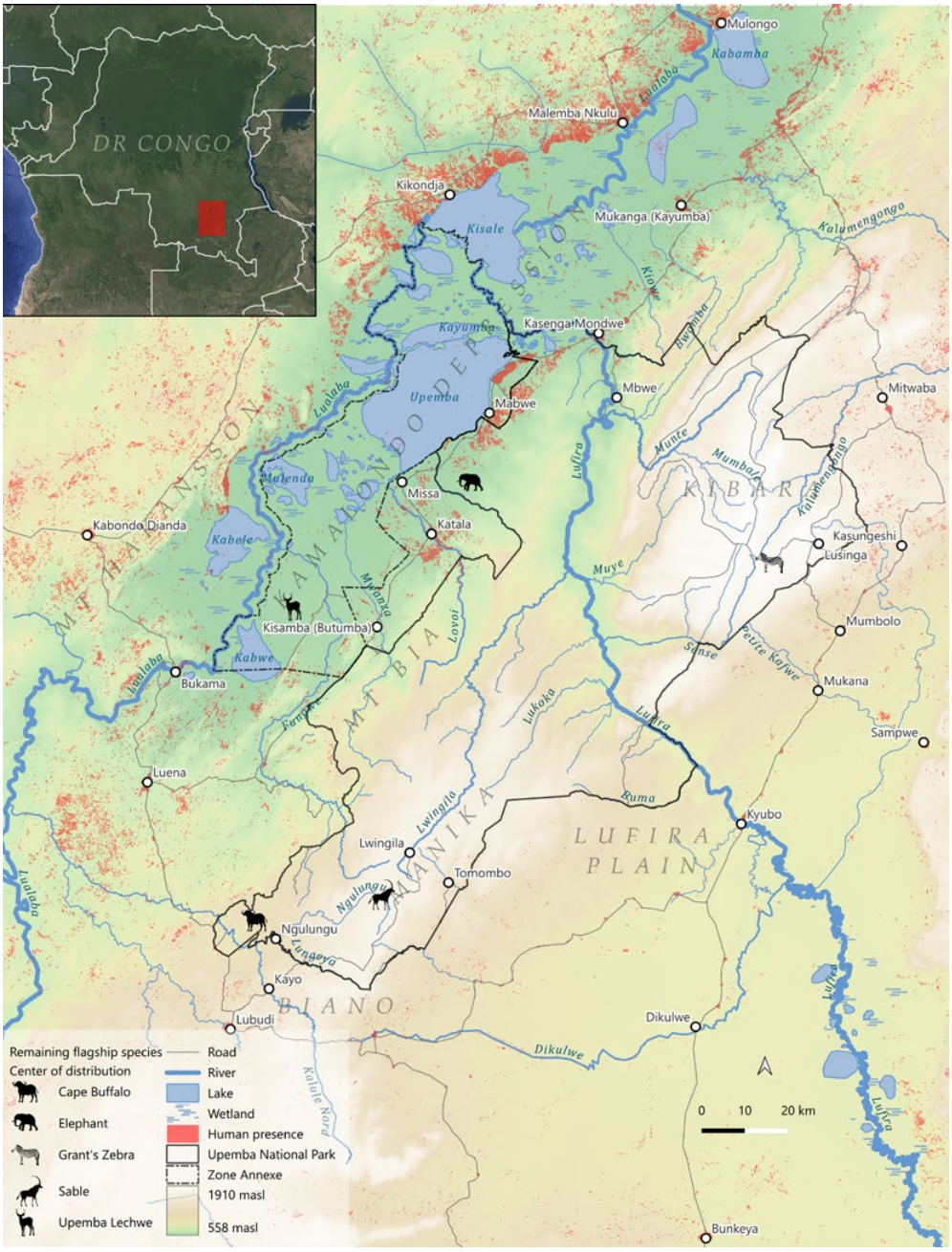


Figure 1. Main locations referred to in the text, protected-area boundaries in the Upemba landscape, and recent anthropogenic land-use signatures. Human-pressure areas combine mapped forest loss (2001–2024), built-up areas (2023) and cropland extent (2022) from Hansen et al. (2013), Sirko et al. (2024) and Lou et al. (2025). Species icons indicate approximate current centres of distribution rather than precise occurrence limits.

Figure 1 locates the principal places referred to in the text and situates recent human pressure within the wider Upemba landscape.

Recent evidence included camera-trap records from 27 sites on the Kibara Plateau, representing 14,203 camera-days accumulated between November 2023 and November 2025 (Alenga, 2025). Because these deployments were concentrated in plateau gallery-forest sites and were not designed as a park-wide occupancy or abundance survey, they were used only to confirm mammal persistence and describe detected species composition at sampled sites. Spatial context for recent anthropogenic pressures was derived from published geospatial works on forest loss, cropland extent and built-up areas, using Google Earth Engine (Gorelick et al., 2017), and used to visualise broad patterns of recent land-use pressure in the wider Upemba landscape. These layers were interpreted as spatial proxies for human pressure rather than as direct measures of ecological effect.

Species status assignments were expressed in five categories: extant, probably extant, possibly extant, probably extirpated and extirpated. ‘Extant’ was reserved for taxa with recent confirmed presence based on direct observations, photographs, camera-trap records, aerial counts or other documentary evidence judged reliable. ‘Probably extant’ was used where recent evidence remained credible but limited, indirect or spatially ambiguous. ‘Possibly extant’ was used for weak, isolated or unconfirmed recent records insufficient to

support stronger inference. 'Probably extirpated' was used where no recent confirmed record existed despite some residual uncertainty arising from older records or nearby occurrences. 'Extirpated' was used where no credible recent evidence existed over a period sufficient to make persistence highly unlikely in management terms. Evidentiary confidence was assigned independently of status category and reflects the strength, recency, directness and convergence of the available records. High confidence indicates recent confirmed records and/or repeated counts from reliable sources; moderate confidence indicates limited but credible recent evidence or convergence among several weaker sources; and low confidence indicates sparse, indirect, spatially ambiguous or weakly confirmed evidence. Where records were contradictory, greater weight was given to the most recent direct and spatially attributable evidence. Management priorities were derived from pressures that are spatially attributable, operationally actionable, and likely to cause further contraction of surviving biological cores. This approach does not rank all conservation needs in Upemba, but identifies the minimum set of stabilisation actions and monitoring targets justified by the current evidence.

This approach has several limitations. Detectability is uneven across taxa, observation effort has been spatially biased towards accessible areas of the park and known or suspected wildlife strongholds, and the evidentiary base is temporally discontinuous, with long gaps between periods of more systematic observation. Many recent records derive from targeted field presence rather than standardised sampling, so non-detection was not treated as evidence of absence except where supported by long-term absence of credible records, historical evidence of decline and management-relevant interpretation. Personal communications and expert field knowledge were used to update, contextualise or corroborate documentary evidence, but were not treated as sufficient on their own for high-confidence status assignments unless supported by direct observations, photographs, repeated observer agreement, aerial counts, camera-trap records or other independently interpretable evidence. The results should therefore be read as a triaged management synthesis.

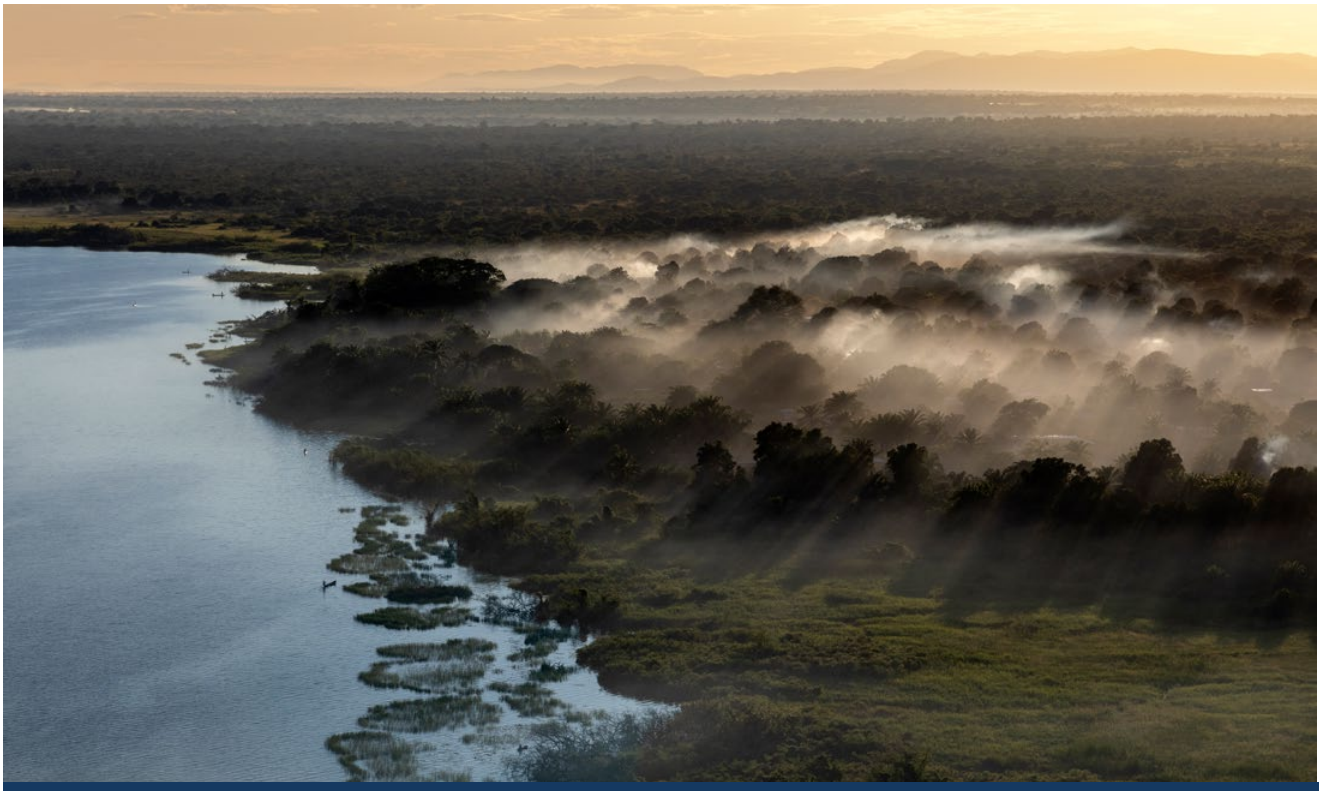
RESULTS

Upemba's large-mammal assemblage is severely reduced. Over roughly seven decades, the park appears to have lost black rhino (*Diceros bicornis*) first, followed by the large carnivores during the 1980s and 1990s, and then several large herbivores during the 1990s and 2000s (d'Huart, 1991; Hasson, 2003, 2015; Verschuren, 1975, 1987). No large-mammal population (>100 kg) is currently known to substantially exceed 200 individuals within this one-million-hectare park. Recent evidence confirms the persistence of elephant (*Loxodonta africana*), Upemba lechwe (*Kobus anselli*), hippo (*Hippopotamus amphibius*), Cape buffalo (*Syncerus caffer*), Grant's zebra (*Equus quagga boehmi*) and sable (*Hippotragus niger kirkii*), but all are small, localised or unevenly distributed. Elephants continue to move within and around the park despite the apparent breakdown of the former movement system through the Lufira Valley by the early 1990s (d'Huart, 1991; Hasson, 2015; Katembo, 2016, 2017; Mululwa, 2008). Upemba Lechwe remain highly localised and number fewer than 100 individuals according to the most recent aerial survey available to this assessment (Cotterill, 2005; Makabuza, 1972; Weber et al., 2025). Zebra show limited recovery from an extreme low point, although numbers remain far below historical levels (d'Huart, 1991; Hasson, 2003; Verschuren, 1975). Table 1 summarises the current management interpretation of large-mammal status, estimated population size within the park, and evidentiary confidence for each taxon, while Table S1 provides the principal species-specific evidence underlying those assignments and Figure S1 visualises the pattern.

Evidence from camera traps, field observations, historical mammal lists and bushmeat studies suggests that depletion is not limited to conspicuous large mammals, but non-detection should not be read as extinction. Historical mammal lists provide a wider baseline for the park's mammal community than is currently detected or regularly observed in recent fieldwork (Frechkop, 1954; Verheyen, 1951). Between November 2023 and November 2025, camera traps deployed across 27 gallery-forest sites on the Kibara Plateau accumulated 14,203 camera-days and recorded 7,596 detections of 22 mammal species, dominated by a relatively small set of medium-sized generalists including bushpig (*Potamochoerus larvatus*), warthog (*Phacochoerus africanus*), yellow baboon (*Papio cynocephalus*) and common reedbuck (*Redunca arundinum*; Alenga, 2025). Field observations indicate that extraction also includes low-value resources such as rodents and termites (Mbulanga, pers. comm.; pers. obs.). Regional demand is substantial: in Lubumbashi, the nearest major city, Tshikung et al. (2019) found that 86.6 per cent of respondents consumed bushmeat at least monthly. Historical accounts from the period of deepest institutional collapse also describe park rangers and their families competing with poachers for rodents as food (Van Leeuwe et al., 2009). These sources indicate that

Table 1. Current management interpretation of large-mammal status in Upemba National Park, based on the most recent available evidence, approximate current population size within the park, and evidentiary confidence. Status categories reflect current management interpretation. 'Extant' indicates recent confirmed presence; 'probably extant' indicates credible but limited recent evidence; 'possibly extant' indicates weak or unconfirmed recent evidence; 'probably extirpated' indicates no recent confirmed records despite residual uncertainty; and 'extirpated' indicates no credible recent evidence over a period sufficient to make persistence highly unlikely. 'Most recent evidence' refers to the latest credible record used in the assessment. Population estimates are approximate and confidence reflects the strength, recency and directness of the available evidence: high = recent confirmed records and/or repeated counts; moderate = limited but credible recent records; low = sparse, indirect or weakly confirmed recent evidence.

Species	Current status	Most recent evidence	Estimated current population in Upemba	Confidence
Black rhino (*Diceros bicornis*)	Extirpated	Last confirmed evidence in 1957; tracks in 1961	0	High
Cheetah (*Acinonyx jubatus*)	Extirpated	Last report from Upemba: 1983	0	High
African wild dog (*Lycaon pictus*)	Extirpated	Last confirmed report: 1986	0	High
Lion (*Panthera leo bleyenberghi*)	Extirpated	Last regular reports: 1991	0	High
Lichtenstein's hartebeest (*Alcelaphus lichtensteini*)	Probably extirpated	Last sighting in Upemba: 2003	0	Moderate
Livingstone's eland (*Taurotragus oryx livingstonii*)	Probably extirpated	Last tracks in/near park: 2013	0	Moderate
Roan antelope (*Hippotragus equinus cottoni*)	Possibly extant, unconfirmed	Tracks photographed near Lusinga in 2023	Unknown; if extant, very low	Low
Waterbuck (*Kobus ellipsiprymnus defassa*)	Possibly extant, very low numbers	Sighting in 2023; tracks in 2024	Very low; probably <20	Low
Spotted hyena (*Crocuta crocuta*)	Possibly extant, very low numbers	Sighting on southern plateau in 2024	Very low; probably <20	Low
Leopard (*Panthera pardus*)	Probably extant	No confirmed record after 2008	Unknown; probably very low	Low
Impala (*Aepyceros melampus katangae*)	Probably extant	Reports from Dikulwe area outside the park in 2018 and 2024	Unknown; probably very low	Low
Greater kudu (*Tragelaphus strepsiceros*)	Probably extant	No firm recent park record; latest evidence indirect	Unknown; probably low	Low
Sable (*Hippotragus niger kirkii*)	Extant	Repeated herd reports, 2021–2025	Probably <150	Moderate
Upemba lechwe (*Kobus anselli*)	Extant, highly threatened and localised	Aerial survey in March 2025	<100	High
Hippo (*Hippopotamus amphibius*)	Extant, very reduced and localised	Eight counted in January 2025; occasional additional reports	Probably <20	High
Elephant (*Loxodonta africana*)	Extant, mostly outside park	Sightings in and around park; regional pattern current to 2026	<100 in park	High
Cape buffalo (*Syncerus caffer*)	Extant, localised	Track counts and camera traps in 2024–2025	<50	High
Grant's zebra (*Equus quagga boehmi*)	Extant	Counts in 2024 and 2025	c. 200	High



Lake Upemba in the Kamalondo Depression is part of an extensive system of shallow lakes, marshes and seasonally flooded plains drained by the Lualaba (upper Congo). These wetlands have supported fishing, settlement and regional exchange for centuries, long before the creation of the national park. © Gwenn Dubourthoumieu/Upemba National Park

bushmeat extraction is not limited to large mammals and may continue even after larger-bodied wildlife has already been heavily reduced.

Fire is frequent, widespread and strongly seasonal in Upemba. Burning was already frequent on the Kibara Plateau in the 1940s (de Witte et al., 1966), and seasonal fire has likely shaped Katangan vegetation for centuries (Louette & Hasson, 2011). Current fire patterns, however, appear predominantly anthropogenic: the park is rich in water and intersected by gallery forests that act as firebreaks, while the annual concentration of fires during the dry season points strongly to human ignition due to the absence of lightning. The montane grasslands of Upemba are likely ancient, and drainage may be more decisive than fire in maintaining their openness (Meerts, pers. comm.). Remote-sensing indicates that annually burned area has increased since the beginning of the century, with over 80 per cent of the park now burning every year and hundreds of dry-season ignitions affecting the park annually (derived from Chuvieco et al., 2018). Published photographs from the 1940s do not show the same extent of tall, dense, unpalatable grasses that now dominate large parts of the plateau, and these grasses were probably less abundant in the 1980s than they are today (Hasson, pers. comm.). Field observations suggest an association between frequent burning and tall woody grasses, especially *Hyparrhenia* spp., which are not preferred by large herbivores, can suppress geophytes of conservation significance, and create high fuel loads (Balole, pers. comm.; Mujinga, pers. comm.; Munro, pers. comm.).

Fire is also linked to hunting. Historical sources describe fire being used to flush game (Delvaux, 1950), and recent field observations indicate that burning is used to smoke rodents out of burrows and to attract animals to fresh regrowth (Kabengele, pers. comm.; Mbulanga, pers. comm.; pers. obs.). These observations suggest that fire in Upemba functions both as a habitat disturbance and a hunting technology. Its ecological consequences remain incompletely understood, but repeated burning may reduce cover and food resources for rodents, reptiles and invertebrates, remove seeds and insect biomass used by birds, damage gallery-forest edges, and contribute to long-term nutrient loss or erosion. Because herbivore populations are now reduced, the interaction between fire, fuel accumulation and diminished grazing pressure is likely to differ from historical conditions.

Beyond poaching and fire, Upemba is affected by deforestation, charcoal extraction, agricultural expansion, settlement growth and wetland use, especially in and around the Kamalondo Depression. Current rates of deforestation, cultivation and urbanisation remain relatively low at landscape scale, but recent geospatial analyses suggest increasing local pressure, with road



Gallery forests following watercourses across the open grasslands of the Kibara Plateau. © Gwenn Dubourthoumieu/Upemba National Park

development likely to increase future risk (derived from Hansen et al., 2013; Lou et al., 2025; Sirko et al., 2024). These pressures are spatially important because several surviving wildlife populations are not concentrated in a remote park interior. Buffalo and zebra persist near the park's margins, elephants occur on and beyond the boundary along the Kamalondo Depression (Katembo, 2016, 2017), and the Upemba lechwe survives in the non-enforced Zone Annexe (Weber et al., 2025). Agricultural expansion, settlement growth and woody biomass extraction therefore overlap with areas used by remaining priority taxa.

Wetland pressure is important in the Kamalondo Depression. Although the Depression remains a highly productive fish landscape, decades of artisanal exploitation and destructive gears are associated with reduced fish biomass and size structure (Katemo Manda et al., 2022, 2023). Papyrus and other wetland plants are harvested for construction materials, weaving, food and medicine, adding pressure to marsh-edge habitats (Ilunga et al., 2023; Kasongo et al., 2022). Nutrient loading from settlements, upstream land use and mining may also be affecting the wetland. Given the shallow character of the lakes, with Lake Upemba not exceeding 3.2 metres during the dry season (Van Meel, 1953), nutrient enrichment, eutrophication and associated ecological shifts should be treated as plausible risks, although their current extent and trajectory remain poorly quantified (Walker et al., 2006). These processes are less visible than the decline of large mammals, but they may affect endemic and localised taxa, fisheries productivity, water quality and habitat suitability for both wildlife and people.

Historically, effective park control has been weak outside the plateau areas. The plateaus were fully controlled only during the 1940s, 1950s and 1970s. Around Lake Upemba and the Kamalondo Depression, the park was only present between 1947–1960, 1986–2004, and again since 2016. Park control gradually faded with each phase of absence and under increasing conditions of settlement growth, weak enforcement, and access negotiated through local chiefs (Mujinga, pers. comm., Hasson, pers. comm.; pers. obs.). The wetland periphery therefore differs from the plateau areas not only ecologically, but also institutionally. Current pressures and available evidence should therefore be interpreted against this spatially uneven history of access, use and control.

DISCUSSION

Upemba does not currently require a comprehensive recovery blueprint so much as a triaged programme for stabilisation. The large-mammal results show that the park is not biologically empty, but they also represent only the most visible component of a more depleted system. Elephants, Upemba lechwe, zebra, sable, buffalo and hippo remain important for management prioritisation, repeated monitoring and public communication, but their persistence should be interpreted as evidence of partial survival rather than

Table 2. Priority management pressures in Upemba National Park and corresponding near-term stabilisation responses. The table is intended as a triaged framework for stabilisation and monitoring rather than a comprehensive recovery plan.

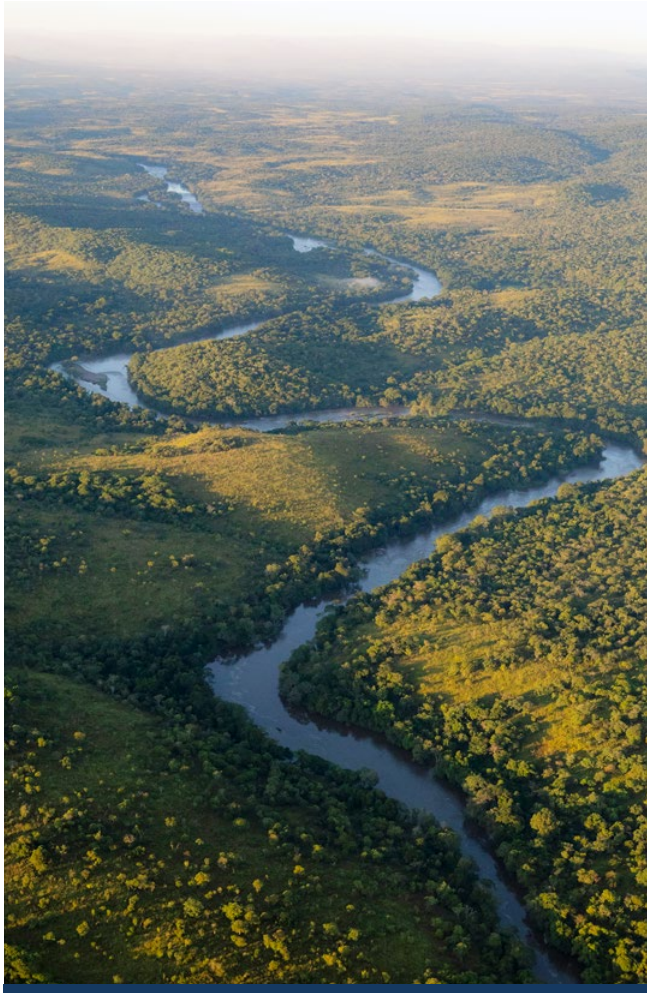
Pressure	Current indication in Upemba	Why it matters ecologically and managerially	Immediate management response
Large-mammal depletion and fragmentation	Multiple large mammals are extirpated, remaining populations persist at fractions of historical abundance (Hasson, 2003, 2015; Van Leeuwe et al., 2009).	Large mammal persistence shows that Upemba is not biologically empty, but current assemblages indicate severe simplification and fragmentation rather than ecological integrity.	Prioritise protection of confirmed strongholds and spatial connections; standardise surveys; avoid treating remnant presence as evidence of broad recovery.
Snaring and bushmeat extraction	Large-mammal status likely understates wider faunal erosion. The available material indicates strong dependence on bushmeat (Hasson, 2003; Tshikung et al., 2019; van Velden et al., 2018).	This is likely a major mechanism of faunal depletion below the level of conspicuous megafauna, affecting medium-sized mammals, prey bases and trophic interactions.	Treat likely prey-base depletion as a core management pressure, not only a subsistence issue; incorporate hunting indicators beyond large mammals.
Fire as hunting tool and habitat pressure	Fire is a key disturbance indicator and strongly associated with poaching (Amoako & Gambiza, 2022; Delvaux, 1950).	Fire is simultaneously an ecological, detectable, spatially attributable and operationally actionable pressure.	Zoning into control blocks delimited by gallery forests; integrate near-real-time detection with repeated seasonal review of burn patterns.
Deforestation, agricultural expansion, and settlement pressure	Deforestation, cultivation and settlement growth remain spatially concentrated, but increasing pressure (Hansen et al., 2013; Lou et al., 2025; Sirko et al., 2024).	Surviving fauna is often concentrated in boundary areas, encroachment thus affects refuge zones, movement routes and wildlife–human interfaces.	Develop participatory land-use planning and delimitation of encroachment fronts where full territorial reclamation is unrealistic, to prevent further expansion into the park.
Wetland degradation and eutrophication	The Kamalondo Depression is under pressure from artisanal fishing, papyrus harvesting, settlement growth and nutrient loading (Ilunga et al., 2023; Kasongo et al., 2022; Katemo Manda et al., 2022, 2023).	Wetland change could remain undetected, but may affect endemic and localised taxa (e.g. Weber et al., 2024), fisheries productivity, water quality, and habitat suitability for both wildlife and people.	Establish wetland sentinel sites and combine remote sensing with in-situ monitoring of water extent and condition, vegetation change, visible anthropogenic pressure, and key taxa where feasible.

ecological integrity. The immediate management task is therefore to prevent further contraction of the surviving biological core, especially confirmed strongholds and recurrent-use areas for priority taxa, while improving the evidentiary basis for future recovery.

The first implication is that monitoring should not remain centred only on conspicuous large mammals. The evidence reviewed here suggests that hunting pressure extends into smaller-bodied mammals and low-value resources, indicating that faunal depletion may continue below the level captured by elephant, zebra or lechwe records. Snaring and bushmeat extraction should therefore be treated as core ecological pressures. A minimal monitoring system should retain large mammals as priority indicators, but should also include hunting signs, snare encounter rates, camera-trap detections of medium-sized mammals, and repeated observations from areas where small-fauna depletion is suspected.

Fire should be treated as both a habitat pressure and an operational indicator. The results suggest that current burning is frequent, largely anthropogenic, and linked at least partly to hunting practices. Its ecological effects remain insufficiently quantified, but repeated dry-season burning may interact with reduced herbivory, tall grass fuel accumulation, geophyte loss, gallery-forest edge damage, and small-fauna depletion. Because fire can be mapped repeatedly and spatially attributed, it is one of the few pressures in Upemba that can support adaptive management at small spatial and temporal scales. A practical stabilisation strategy should combine satellite-based fire monitoring with ground checks of ignition points, burn recurrence, fuel structure, and post-burn habitat condition.

The Kamalondo Depression requires a different management logic from the plateau areas. On the plateaus, especially where field presence and access are stronger, stabilisation can focus on protection of



The Lufira River, the principal waterway in the park linking Upemba's plateau catchments to the wetlands of the Kamalondo Depression and the upper Lualaba. The Lufira served as elephant migration corridor until the 1990s. © Gwenn Dubourthoumieu/ Upemba National Park

remaining large-mammal strongholds, fire management and repeated patrol-linked monitoring. In the wetland periphery and Zone Annexe, where settlement, fishing, papyrus harvesting, agricultural expansion and negotiated access are more important, conservation cannot credibly be framed only as the recovery of full territorial control. The more realistic near-term objective is damage limitation through participatory land-use planning, protection of critical lechwe and wetland habitats, and sentinel monitoring of water, vegetation, fishing pressure and localised taxa.

Uncertainty should be treated selectively. For taxa such as leopard, impala, greater kudu, waterbuck, spotted hyena and possibly roan antelope, the immediate need is targeted confirmation rather than broad survey ambition. For wetlands, the priority is not an exhaustive limnological programme, but a small number of sentinel sites capable of detecting whether habitat condition in the most important areas is stable, deteriorating or approaching plausible thresholds of change. For fire, the priority is to link repeated burn patterns to fuel structure, herbivore absence, geophyte persistence, gallery-forest damage and small-fauna condition. Table 2 summarises these pressures and the corresponding near-term stabilisation responses.

Longer-term recovery will require a broader research and management agenda, especially on plateau vegetation change, landscape connectivity, wetland function, and endemic or otherwise neglected biodiversity whose status could alter conservation priorities. However, that agenda should follow stabilisation rather than substitute for it. Any future large-mammal reintroduction would probably be limited to the plateau areas and would require substantially stronger protection than currently exists. Natural recolonisation from remnant herbivore populations outside the park may be possible for some taxa (Hasson, pers. comm., Mujinga, pers. comm.).

CONCLUSIONS

Upemba is highly endangered, but not yet lost. It has lost multiple large mammals, its surviving populations are small and localised, and current pressures extend below the level of visible megafauna. Elephants, Upemba lechwe, zebra, sable, buffalo and hippo still persist, but their survival indicates partial resilience rather than ecological integrity. Bushmeat extraction, recurrent anthropogenic fire, encroachment and wetland degradation continue to erode the ecological base on which those remnant populations depend.

Upemba remains a high-priority protected area because a small but significant biological core persists under strong and interacting pressures. The most defensible near-term strategy is stabilisation: protecting surviving strongholds, monitoring the pressures most likely to contract them further, and concentrating research on uncertainties that affect short-term management decisions. Recovery may remain possible in parts of the system, but only if further erosion is first slowed or prevented.

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Manuel Weber is research and biomonitoring advisor for Upemba National Park, Democratic Republic of Congo. His work focuses on the historical and contemporary ecology of the Upemba landscape and on measuring conservation management impact using interdisciplinary approaches in Upemba and beyond.
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RESUMEN

El Parque Nacional de Upemba, situado en el sur de la República Democrática del Congo, sigue siendo un área protegida de alto valor de conservación sobre la que aún no se ha realizado una síntesis exhaustiva de los datos ecológicos recientes. Este artículo evalúa el estado actual del parque utilizando fuentes publicadas, literatura gris, registros de campo recientes, datos de cámaras trampa, observaciones aéreas y conocimientos de campo de expertos. Upemba ha perdido numerosas especies de mamíferos de gran tamaño en las últimas siete décadas, y las poblaciones supervivientes son pequeñas, localizadas y están distribuidas de forma desigual. Estas poblaciones remanentes indican una resiliencia parcial más que una integridad ecológica. Los datos disponibles sugieren que el agotamiento se extiende más allá de la megafauna visible y está asociado a la caza de animales silvestres para el consumo, los incendios antropogénicos recurrentes, la invasión de tierras y la degradación de los humedales, especialmente allí donde el control efectivo es débil. En estas condiciones, la tarea de conservación inmediata es la estabilización, más que la recuperación integral. La gestión a corto plazo debería dar prioridad a la protección de los bastiones confirmados y las zonas de uso recurrente para los taxones prioritarios, al seguimiento repetido de los grandes mamíferos y la presión cinegética, al seguimiento sistemático de los incendios y a los sitios centinela específicos en los humedales. La investigación debería centrarse en las incertidumbres que afectan a las decisiones de gestión a corto plazo. Upemba está en grave peligro de extinción, pero aún no se ha perdido; lo que queda es suficiente para justificar una estabilización específica.

RÉSUMÉ

Le parc national d'Upemba, situé dans le sud de la République démocratique du Congo, reste une aire protégée à haute valeur de conservation pour laquelle les données écologiques récentes n'ont pas fait l'objet d'une synthèse exhaustive. Cet article évalue l'état actuel du parc à l'aide de sources publiées, de la littérature grise, de relevés de terrain récents, de données issues de pièges photographiques, d'observations aériennes et des connaissances de terrain d'experts. Upemba a perdu de nombreux grands mammifères au cours des sept dernières décennies, et les populations survivantes sont peu nombreuses, localisées et inégalement réparties. Ces populations résiduelles témoignent d'une résilience partielle plutôt que d'une intégrité écologique. Les données disponibles suggèrent que le déclin s'étend au-delà de la mégafaune visible et est associé à l'exploitation de la viande de brousse, aux incendies d'origine anthropique récurrents, à l'empiétement et à la dégradation des zones humides, en particulier là où les mesures de contrôle efficaces sont insuffisantes. Dans ces conditions, la priorité immédiate en matière de conservation est la stabilisation plutôt qu'un rétablissement complet. La gestion à court terme devrait donner la priorité à la protection des bastions confirmés et des zones d'utilisation récurrente pour les taxons prioritaires, au suivi répété des grands mammifères et de la pression de chasse, à la surveillance systématique des incendies, ainsi qu'à la mise en place de sites sentinelles ciblés dans les zones humides. La recherche devrait se concentrer sur les incertitudes qui affectent les décisions de gestion à court terme. L'Upemba est gravement menacée, mais pas encore perdue; ce qui en reste est suffisant pour justifier une stabilisation ciblée.

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